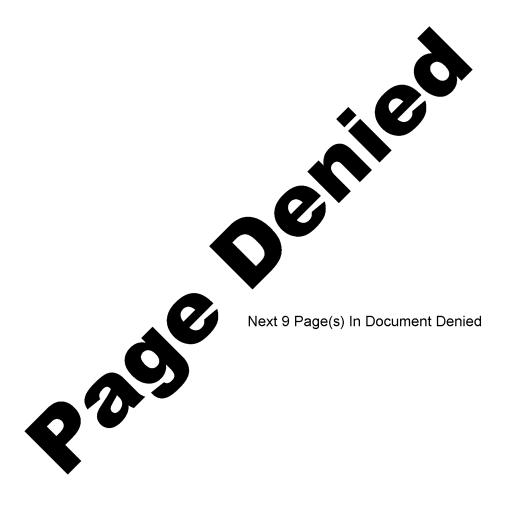
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THE FIRST ANNUAL CONFERENCE ON OPTICAL STORAGE FOR SMALL SYSTEMS June 5-7, 1985

Information Storage Inc.

OPTICAL MASS STORAGE FOR SMALL COMPUTER SYSTEMS: ISI'S PHILOSOPHY AND PRODUCTS

BY

RICHARD G ZECH VICE-PRESIDENT - MARKETING AND SALES INFORMATION STORAGE INC.

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VII	THE ISI PRODUCT LINE THE SYSTEM IS THE SOLUTION
VIII	THE FUTURE - REALIZING THE TRUE POTENTIAL OF OPTICAL STORAGE
	TECHNOLOGY
IX	ABOUT ISI



PAGE 2

I. INTRODUCTION

- A. ISI'S BUSINESS PHILOSOPHY
 - 1) QUANTIFIABLE MARKET SIZE AND NEED MUST DRIVE PRODUCT
 DEVELOPMENT
 - 2) OUR MARKET IS BUSINESS AND PROFESSIONAL USERS OF SMALL COMPUTER SYSTEMS
 - 3) WE ARE SELLING NEW BUSINESS OPPORTUNITIES AND
 SOLUTIONS TO INFORMATION INTEGRITY, PRESERVATION,
 AND DISTRIBUTION OPPORTUNITY PROBLEMS -- NOT A TYPE
 OF TECHNOLOGY OR HARDWARE
 - 4) OUR PRODUCTS MUST BE COMPATIBLE WITH THE MAINSTREAM
 OF SMALL COMPUTER SYSTEM USAGE
- B. THE IMPORTANCE OF WRITE-ONCE OPTICAL STORAGE SYSTEMS
 - 1) HAS THE BEST FEATURES OF MAGNETIC DISK AND TAPE
 - 2) PROVIDES SIMULTANEOUSLY BOTH ON-LINE DIRECTLY

 ACCESSIBLE AND PERMANENT, LOW-COST/MBYTE STORAGE ON
 A WRITABLE, REMOVABLE MEDIUM
 - 3) PROVIDES REAL INFORMATION INTEGRITY
 - 4) REPRESENTS A VERY IMPORTANT PRODUCTIVITY TOOL



PAGE 3

II. THE APPLICATIONS SPECTRUM -- REAL AND IMAGINARY

- A. OPTICAL STORAGE OFFERS TODAY, AND WILL CONTINUE TO CREATE, NEW AND COST-EFFECTIVE OPPORTUNITIES FOR USING, DISTRIBUTING, AND PRESERVING AN ASSET OF RAPIDLY GROWING IMPORTANCE TO BUSINESS AND THE PROFESSIONS -- INFORMATION.
- B. WRITE-ONCE IS A VIRTUE, NOT A LIABILITY, IN THOSE

 APPLICATIONS WHERE THE VALUE OF THE INFORMATION STORED

 EXCEEDS THE COST OF THE STORAGE MEDIUM USED TO STORE IT.
- C. OPTICAL STORAGE, EVEN WHEN ERASABLE OPTICAL MEDIA ARE WIDELY AVAILABLE AND RELIABLE, IS NOT A ONE-FOR-ONE REPLACEMENT FOR EITHER MAGNETIC DISK OR TAPE STORAGE.
- D. NOT ALL STORAGE PROBLEMS WITH THE WORDS "MASS" AND/OR "ARCHIVAL" WRAPPED AROUND THEM REQUIRE OPTICAL STORAGE.



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III. THE OEM MARKET IMPERATIVES

- A. RELIABILITY, RELIABILITY, RELIABILITY
- B. LOW UNIT COST--DRIVES AND MEDIA
- C. ABILITY TO MEET SCHEDULE AND VOLUME COMMITMENTS
- D. PERFORMANCE
 - 1) HIGH CAPACITY (50 MB to 4 GB RANGE)
 - 2) HIGH DATA TRANSFER RATE (1 MBPS TO 10 MBPS RANGE)
 - 3) FAST ACCESS (< 100 MS AVERAGE)
- E. SECOND SOURCING--DRIVES AND MEDIA
- F. STANDARDS
 - 1) CONTROLLER
 - 2) MEDIA
 - 3) SOFTWARE
 - 4) FORM FACTOR
- G. WO/RM AND OROM Modes of Operation Now -- Erasable Later

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IV. THE ISI DESIGN AND DEVELOPMENT PHILOSOPHY

- A. EMPHASIZE RELIABILITY, SIMPLICITY, AND MANUFACTURABILITY
- B. USE PROVEN COMPONENTS AND METHODS WHEREVER FEASIBLE -- BUY, DON'T BUILD
- C. DESIGN IN SUBSTANTIAL MARGINS -- AVOID THE "CUTTING EDGE"
- D. PROVIDE A COMPATIBLE GROWTH PATH TO HIGHER PERFORMANCE LEVELS
- E. CREATE THE BUILDING BLOCKS REQUIRED FOR FULLY-INTEGRATED
 SYSTEMS AND SERVICES



PAGE 6

V. THE ISI 5-1/4" OPTICAL DISK DRIVE FAMILY

- A. FULL AND HALF HEIGHT 5-1/4" FORM FACTOR OPTICAL DISK DRIVES
- B. PERFORMANCE RANGE GOALS

O CAPACITY : 100 MB - 400 MB

(FORMATTED AND CERTIFIED)

O AVERAGE ACCESS TIME : 50 MS - 200 MS

O DATA TRANSFER RATE : 2.5 MBPS - 10 MBPS

- C. WRITE-ONCE NOW, ERASABLE LATER
- D. SPECIFICATIONS FOR THE FIRST MEMBER OF THE FAMILY, THE 525 WC:

(SEE NEXT PAGE)



PAGE 7

V. (CONT.)

ISI'S OPTICAL DISK DRIVE

THE 525 WC

- O DESIGNED FOR SINGLE-USER BUSINESS AND PROFESSIONAL SYSTEMS
 -- DESKTOP COMPUTERS, WORKSTATIONS, AND OFFICE AUTOMATION
 TERMINALS
- O PROVIDES SIMULTANEOUSLY BOTH ON-LINE, DIRECTLY-ACCESSIBLE AND ARCHIVAL, LOW COST/MEGABYTE STORAGE
- O COMES IN STANDARD 5-1/4" FULL HEIGHT FORM FACTOR AND WITH ESDI DRIVE INTERFACE (PC BUS AND SCSI CONTROLLERS AVAILABLE)

*** KEY SPECIFICATIONS ***

FORMATTED AND CERTIFIED CAPACITY DATA TRANSFER RATE AVERAGE ACCESS TIME ROTATIONAL SPEED NUMBER OF USER TRACKS NUMBER OF SECTORS/TRACK USER DATA/SECTOR	100 MBYTES 2.5 MBPS 200MS (MAX.) 1800 RPM 14,900 32 256 BYTES
ERROR RATES - POSITIONING - READ (WITH ISI CONTROLLER) MTBF POWER REQUIREMENT ENVIRONMENT	10-6 10-12 15,000 Hours 20 Watts (Max.)
- AIR TEMPERATURE	60-90 ⁰ F OPERATING 50-110 ⁰ F Non-operating
- HUMIDITY WEIGHT	8-80% 4.5 LBS.

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Information Dichage to

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- VI. THE ISI SUPERSTORE 2000 OPTICAL DISK CARTRIDGE FAMILY
 - A. 13-CM SINGLE AND DOUBLE SIDED WRITE-ONCE DISKS
 - B. ALL DISKS FORMATTED AND CERTIFIED
 - C. ALL DISKS PACKAGED IN A HARD-SHELL PLASTIC CARTRIDGE
 HAVING A STAINLESS STEEL SHUTTER AND WRITE-PROTECT SWITCH
 - D. GOAL OF 100 MB 200 MB OF USER DATA PER SURFACE
 - E. SPECIFICATIONS FOR THE FIRST MEMBER OF THE FAMILY, THE SUPERSTORE 2000:

(SEE NEXT PAGE)



VI. (CONT.)

PAGE 9

ISI'S OPTICAL DISK CARTRIDGE

THE SUPERSTORE 2000

- O 100 MILLION BYTES OF USER STORAGE*
- O FULLY-ENCAPSULATED DATA STORAGE SURFACES
- O HARD-SHELL PLASTIC CARTRIDGE WITH WRITE PROTECT SWITCH
- O FORMATTED AND CERTIFIED (PROJECTED READ ERROR RATE OF 10-12 AT END OF SERVICE LIFE)
- O 10-YEAR PROJECTED SERVICE LIFE UNDER ORDINARY ENVIRONMENTAL AND USAGE CONDITIONS
- O RETAIL PRICE GOAL OF < \$60
- O SOFTWARE AND DATABASES CAN BE PRE-WRITTEN
- O THE EQUIVALENT STORAGE OF 300 TYPICAL 5-1/4" FLOPPY DISKS AT LESS THAN 10% OF THE COST*
- O LOWEST COST ON-LINE OR OFF-LINE 5-1/4" DATA STORAGE MEDIUM
- O A REMOVABLE DATA STORAGE MEDIUM OF EXCEPTIONAL RELIABILITY
- O A PRODUCT RESPONSIVE TO QUANTIFIED END USER REQUIREMENTS
- * THIS IS A GUARANTEED MINIMUM. CAPACITY OF PRODUCTION DISKS MAY BE AS HIGH AS 120MB. DOUBLE-SIDED DISKS MAY HAVE UP TO 240MB OF STORAGE.



Internation Storage to

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VII. THE ISI PRODUCT LINE -- THE SYSTEM IS THE SOLUTION

- A. COMPLETE OPTICAL MASS STORAGE SUBSYSTEMS FOR EITHER FRONT
 PANEL INTEGRATION OR ATTACHMENT
- B. COMPONENTS
 - 1) DRIVES
 - 2) MEDIA
 - 3) CONTROLLERS
 - 4) SOFTWARE
- C. SYSTEMS
 - 1) FRONT PANEL INTEGRATION KIT: DRIVE, CONTROLLER, SOFTWARE, AND CARTRIDGE
 - 2) ATTACHABLE SUBSYSTEM (OPTICAL STORAGE INTEGRATION SYSTEM): DRIVE, CONTROLLER, SOFTWARE, CABINET WITH POWER SUPPLY, INTERFACE CABLE, AND TWO CARTRIDGES



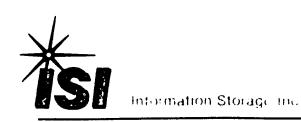
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VII. (CONT.)

ISI OPTICAL STORAGE INTEGRATION SYSTEM

- A. SIMPLIFIES EVALUATION AND DESIGN-IN FOR OEM'S
- B. MAKES VERTICAL APPLICATION DEVELOPMENT EASY
- C. A REAL, ATTACHABLE OPTICAL STORAGE SYSTEM - -
 - O 525 WC OPTICAL DISK DRIVE
 - O SUPERSTORE 2000 OPTICAL DISK CARTRIDGES (2)
 - O PC/525 OPTICAL DRIVE CONTROLLER
 - O ISDOS SYSTEMS SOFTWARE
 - O CABINET WITH POWER SUPPLY
 - O INTERFACE CABLE
 - O DOCUMENTATION PACKAGE

WORKS WITH IBM PC'S OR TRUE COMPATIBLES
USING MICROSOFT'S MS-DOS OPERATING SYSTEM



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VII. (CONT.)

SPECIAL FEATURES OF THE 1S1 525 WC 5-1/4" OPTICAL DISK DRIVE AND SUERSTORE 2000 CARTRIDGE

A. HIGH PERFORMANCE/
BALANCED PERFORMANCE

THE RESULT OF A MINIMUM OF 100 MBYTES OF ERROR-CORRECTED, ON-LINE USER STORAGE WITH WINCHESTER-LIKE DATA TRANSFER RATE AND ACCESS TIMES.

B. HIGH RELIABILITY

THE RESULT OF CONSERVATIVE PERFORMANCE GOALS, PROPRIETARY SERVO SYSTEMS, ERROR DETECTION AND CORRECTION CODING, AND THE USE OF PROVEN COMPONENTS.

C. Low Cost

THE RESULT OF A SIMPLE DESIGN AND STANDARD PACKAGING AIMED AT VOLUME PRODUCTION.

D. SECURE, REMOVABLE STORAGE

THE RESULT OF THE SUPERSTORE 2000
OPTICAL DISK CARTRIDGE DESIGN THAT
FEATURES ENCAPSULATED DATA SURFACES,
IMBEDDED SERVO DATA, A HARD-SHELL PLASTIC
CARTRIDGE, AND FULL CERTIFICATION.

E. FLEXIBILITY

THE RESULT OF VARIOUS MODES OF OPERATION

- WORM, OROM, OR COMBINATION
- SERIAL OR RANDOM READ
- ON-LINE OR ARCHIVAL STORAGE
- PARTITIONED STORAGE WITH RAPID ACCESS



VII. (CONT.)

PAGE 13

BENEFITS OF ISI'S 5-1/4" OPTICAL STORAGE SYSTEMS

- A. HIGH CAPACITY -- ON-LINE AND OFF-LINE
- B. HIGH RELIABILITY
 - 1) NO HEAD CRASHES
 - 2) ERROR DETECTION AND CORRECTION
 - 3) PROVEN COMPONENTS
- C. HIGH PERFORMANCE -- COMPARABLE TO 10MB HARD DISK DRIVES
- D. REMOVABLE DISK CARTRIDGE -- <u>IDEAL FOR BACKUP, ARCHIVING, AND DATA TRANSPORT</u>
- E. LOW UNIT COST FOR BOTH DRIVES AND DISKS
- F. COMPLEMENTS THE STORAGE CHARACTERISTICS OF HARD DISK AND TAPE
 DRIVES --

ADDS A NEW DIMENSION TO MASS STORAGE

- G. IMPROVES THE PERFORMANCE OF HARD DISK DRIVES BY OFF-LOADING INFREQUENTLY USED OR READ-ONLY FILES, DATABASES, AND SOFTWARE
- H. PERMITS THE DESIGN-IN OF LOW-CAPACITY, HIGH-THROUGHPUT, MORE RELIABLE, AND LESS EXPENSIVE HARD DISK DRIVES -- ENDS THE PRESSURE TO ADD EVER LARGER HARD DISK DRIVES TO SINGLE USER SYSTEMS



Internation Stockers

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- VIII. THE FUTURE REALIZING THE TRUE POTENTIAL OF OPTICAL STORAGE TECHNOLOGY
 - A. PROVIDE MARKET LEADERSHIP
 - B. DEVELOP PRODUCTS BASED ON RATIONAL MARKET NEED, NOT ON WHAT THE ULTIMATE CAPABILITY OF OPTICAL TECHNOLOGY MAY PROVIDE
 - C. DEVELOP AND SUPPORT APPLICATIONS THAT EXPLOIT THE STRENGTHS AND BENEFITS OF OPTICAL TECHNOLOGY
 - D. ESTABLISH BASIC STANDARDS
 - E. COMMIT TO THE INDUSTRY AND END USERS



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IX. ABOUT ISI

- A. FOUNDED OCTOBER 1983 BY STEVE S. POPOVICH
- B. FINANCED BY R&D CONTRACTS/EQUITY PARTICIPATION TOTALING \$13.1 MILLION WITH CPT, SPERRY, AND TALLGRASS
 TECHNOLOGIES
- C. EXCEPTIONALLY STRONG MANAGEMENT AND ENGINEERING TEAM
- D. DEVELOPED FIRST FULLY-FUNCTIONAL 5-1/4" WRITE-ONCE
 OPTICAL STORAGE SYSTEM
- E. A FULLY-INTEGRATED OEM SUPPLIER OF OPTICAL STORAGE
 PRODUCTS FOR SMALL COMPUTER SYSTEMS
 - 1) OFF-SHORE MANUFACTURING FACILITY IN PLACE -PRODUCTION RAMPUP BEGINS JULY 1985. PROJECTED 1986
 CAPACITY OF 20,000 DRIVES PER MONTH
 - 2) EXCLUSIVE ARRANGEMENT WITH SUMITOMO CHEMICAL FOR
 OPTICAL DISKS -- PRODUCTION RAMPUP BEGINS IN AUGUST
 1985. PROJECTED 1986 CAPACITY OF 100,000 DISKS PER
 MONTH
 - 3) INDEPENDENT VALUE-ADDED OPTICAL MEDIA COMPANY -DIGITAL DATA DISK CORPORATION. WILL PROVIDE
 SUPERSTORE 2000 CARTRIDGES TO OEM CUSTOMERS AND
 RETAIL STORES AND SERVICES TO INFORMATION /
 DATABASE / SOFTWARE PUBLISHERS
 - 4) COLORADO SPRINGS HEADQUARTERS, R&D, AND SPECIAL
 SYSTEMS FACILITY BEING BUILT IN LOCAL AIRPORT FREE
 TRADE ZONE